

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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## INTRODUCTION.

The MONTHLY WEATHER REVIEW for January, 1899, is based on about 2,762 reports from stations occupied by regular and voluntary observers, classified as follows: 162 from Weather Bureau stations; numerous special river stations; 32 from post surgeons, received through the Surgeon General, United States Army; 2,385 from voluntary observers; 96 received through the Southern Pacific Railway Company; 29 from Life-Saving stations, received through the Superintendent United States Life-Saving Service; 31 from Canadian stations; 10 from Mexican stations; 7 from Jamaica, W. I. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Dr. Mariano Bárcena, Director of the Central Meteorological and Magnetic Observatory of Mexico; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kim-

ball, Superintendent of the United States Life-Saving Service; and Commander J. E. Craig, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local meridian is mentioned.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

The storms of January, 1899, presented no unusual features.

From the 1st to the 4th a disturbance crossed the northern districts from the Pacific to the St. Lawrence Valley, causing wind velocities of 50 miles an hour on the north Pacific coast the night of the 1st, and strong gales over the Lake region during the 4th. Following the passage of this storm a marked fall in temperature occurred in the lower Missouri and upper Mississippi valleys on the 4th, and by the morning of the 5th the temperature had fallen to zero in northern Iowa.

Two storms appeared over Texas or the Rio Grande Valley, one advancing from Texas to the St. Lawrence Valley from the 5th to the 7th, and the other from the Rio Grande Valley to the region north of the St. Lawrence during the 13th and 14th. The first of these storms caused heavy snow in the upper Ohio Valley and the lower Lake region on the 6th, and heavy gales the night of the 6th over the lower Lakes and along the north Atlantic coast. The Rio Grande Valley storm reached the lower Lake region the morning of the 14th, and during the day and night of that date caused high winds from the lower Lake region over the middle Atlantic and New England coasts.

The fourth storm of the month, which appeared on the 22d as a trough of low barometric pressure extending from Minnesota to Texas, drifted eastward over the Lake region during the 23d and reached the Atlantic coast on the 24th. During the night of the 24th this disturbance increased rapidly

in intensity and caused gales of 50 to 60 miles an hour along the north Atlantic coast, with a maximum velocity of 68 miles per hour at New York City, 56 at Cape Henry, and 48 at Woods Hole.

The final important storm of the month moved from the British Northwest Territory to the St. Lawrence Valley from the 24th to the 26th. While crossing the Lake Superior region this storm developed great strength and was attended during the day of the 26th by gales of 50 to 70 miles an hour over the Great Lakes. The night of the 26th correspondingly high wind velocities were registered along the north Atlantic coast. Following the passage of this disturbance the most important cold wave of the month overspread the upper Missouri Valley the night of the 27th. By the morning of the 28th the temperature was 22° to 26° below zero in North Dakota, and by the morning of the 29th the line of zero temperature was traced to southern Missouri and southern Kansas. During the last three days of the month a cold wave advanced from the northern Rocky Mountain region to the west Gulf and Middle Atlantic States, carrying zero temperatures to southern Kansas and freezing weather to west-central Texas on the 30th, and zero temperature to Oklahoma and northwestern Texas by the morning of the 31st.

Reports indicate that the warnings issued in connection with these storms and cold waves were of material value to shipping and transportation interests, and that in the truck-

ing districts of the Southwest, and more especially in Texas, the special warnings of freezing weather prompted measures of protection which resulted in averting large losses of produce.

The value of the warnings of freezing weather to the truck farmers is indicated by the following letter addressed to Dr. I. M. Cline, section director, Weather Bureau, Galveston, Tex., by Mr. B. F. Johnson, President Gulf Coast Horticultural Association:

I want to thank you, and through you, the Weather Bureau people for the promptness and accuracy of your warnings. We could not get along without them.

Four years ago you began giving us these warnings and since that time our truck farming has increased ten fold and will continue to grow under the fostering care of the Weather Bureau.

Your forecasts have been, in the main, correct to a degree, and I trust you will be permitted to continue the good work.

#### CHICAGO FORECAST DISTRICT.

Warnings were issued on the 4th for the cold wave which covered the eastern portion of the district on the 5th. No other cold wave of importance appeared until the 26th, the weather, as a rule, continuing comparatively mild in the meantime. In rapid succession three areas of high barometer with extreme cold moved across the district from the northwest, the first appearing the morning of the 26th, the second the morning of the 28th, and the third during the day of the 29th. Signals were ordered and warnings sent well in advance of the cold waves, except in the extreme Northwest, before the sudden development of the 28th.

The temperature forecasts have been closely watched by various interests, the movement of perishable goods being absolutely controlled by the forecasts during the winter months. The shipping interests which maintain winter service on Lake Michigan have been furnished information regarding winds whenever such information might be of value, and on the evening of the 25th a warning was issued that it would be dangerous to leave port, especially to vessels bound to or from points on the east shore of the lake.—*H. J. Cor, Forecast Official.*

#### SAN FRANCISCO FORECAST DISTRICT.

Prior to January 1 there had been a period of extreme drought which had prevailed in this State for twenty-one months. On December 31 a general rain warning was distributed throughout northern California, and on the morning of the 1st a similar warning was distributed in southern California. Rain forecasts were generally made for the next two weeks, when there was much rainfall in the State, an average of 3.50 inches, or more than one-half of an inch above the January normal, which has rendered it decidedly probable that good crops will be obtained from the northern half of the State and has prevented serious injury to stock and grain prospects in the southern part of the State.

On January 6 a southeast storm signal was hoisted at Eureka, and on the 9th at San Francisco and points north, while the information signal was displayed at Port Harford. These signals were continued on the 10th and storm signals ordered as far south as Ventura, and at 8 a. m. information signals were ordered at Los Angeles and San Diego. The information signals were changed to storm at 2:30 p. m. of the same date. Storm signals were continued from Ventura northward on the coast on January 11. During the period that these signals were displayed one of the most severe storms of which we have a record prevailed along the entire coast, verifying the storm signals at all points. Some damage

resulted, but undoubtedly the injury was greatly diminished owing to the display of the signals, for hardly a vessel attempted to leave any California port during the time the signals were displayed. In many instances regular liners remained in port; vessels that were out were in some instances a number of days overdue owing to the storm; the schooner *Jewel* was wrecked off the Mendocino coast; the river steamers between this point and Sacramento were forced to seek places of safety; the freight ferryboat *Thoroughfare* nearly capsized owing to the cars being thrown from the track; a large amount of injury was done to streets, sewers, etc. At the towns on the north side of the bay considerable injury resulted; several small houses were blown down and others were unroofed. Considerable damage was done to the sea wall at Sausalito; piling was washed out, railroad tracks flooded, etc.—*W. H. Hammon, Professor.*

#### PORTLAND, OREG., FORECAST DISTRICT.

Vessels remained in port during wind signals. During the gale of the 13-14th, on Puget Sound, the ship *Adelana*, at anchor at Tacoma, sunk. The disaster was due to the manner in which the ship was moored. She was held by a cable and ballast logs and the latter moved. She had discharged her freight and ballast and a slight change in position was sufficient to cause her to dip, fill with water, and sink.

The snow forecasts issued were of great benefit to railroad companies, farmers, and stock men.

The river warnings issued on the 21st were of special value to merchants on Front street. Many were preparing to move goods from cellars, but desisted when assured that there was no danger from flood.—*B. S. Pague, Forecast Official.*

#### AREAS OF HIGH AND LOW PRESSURE.

During the month there were ten highs and fourteen lows sufficiently well defined to be traced on Charts I and II. The accompanying table exhibits some of the principal points relating to the place of origin and disappearance, the duration and velocity of these conditions, and the following more particular description is added:

*Highs.*—Six of the highs were first noted to the north of Montana, and the other four in the middle Rocky Mountain plateau. The general path was toward the east and northeast. One was last seen in the west Gulf, five off the south Atlantic coast, and three near Newfoundland. No severe cold waves were experienced during the month. On the evening of 4th, as high No. II was central in the north Rocky Mountain region, a fall in temperature of 35° in twenty-four hours occurred at La Crosse, and of 32° at Dubuque and Keokuk. The next morning Keokuk and Davenport experienced a fall of 40°. On the morning of 7th, as high No. III approached the middle Gulf States, there was a fall of 40° at Atlanta, and of 38° at Montgomery. On morning of 26th, as high No. VIII moved to the north of Dakota, a fall in temperature of 54° occurred at Qu'Appelle, and of 50° at Williston. On the morning of 27th, as the same high moved to northeast Kansas, there was a fall of 46° at Parry Sound, and of 44° at Alpena.

*Lows.*—Of the storms of the month two were first noted off the north Pacific coast and two off the south Pacific. Four were first seen to the north of Montana and three near Manitoba, and the three remaining were first seen in Texas. The path of all the storms was east and northeast, and twelve of them disappeared over or near Newfoundland. No. IV was last seen in the middle Gulf, and XII disappeared off the middle Atlantic coast.